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"Oh This Learning, What a Thing It Is!"—Putting Sustainability First in Teaching Techniques and in Content

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Abstract: Although sustainability has become a strategic topic at many universities, working towards a learning approach in which sustainability is the fundament underlying and permeating the entire course is hardly straightforward. This paper is a case study on the development, the teaching, and the evaluation of one specific course that aims to achieve this. Based on (participant) observation, documents, and discussion with students and other stakeholders, we describe and analyze the results of the transformation of the course 'advanced management accounting techniques' for Masters students at the University of Groningen, in the academic year 2017–2018. We show how the course was transformed in a way to increase both a general, a business, and an accounting awareness of the importance of sustainability, while also applying a new teaching approach, namely lemniscate learning, to support this. Our course was the first in the faculty to make this transformation, and although the majority of the students were enthusiastic, the faculty staff was cautiously positive. In presenting our findings, we aim at supporting educators and other stakeholders at universities, by supplying a case study on the transformation of our course, and by scrutinizing the problems that we encountered, the feedback, both positive and negative, that we received, and the challenges that still face us, both on a course and a university level. Thus, we hope to be a source of inspiration and advice for others and to further advance our understanding of the dilemmas, practicalities, and challenges in working towards sustainability in teaching.

Keywords: case study; sustainable education; practice-oriented teaching; management accounting; lemniscate learning

1. Introduction

"Oh This Learning, What a Thing It Is!" [1]. Shakespeare's famous line on learning seems to encompass an everlasting truth, as challenges still abound 400 years later. Currently, teaching at the university faces three major challenges. First, in the era of advancing technologies, university courses are available at nearly free (zero marginal costs) rates to an almost unlimited number of students. Around 23 million new learners signed up for their first MOOC (Massive Open Online Course) in 2017, taking the total number of learners to 81 million, an exponential growth that doubles the number of courses every two years (https://www.class-central.com/report/mooc-stats-2017/). Given that, the "traditional" university program teaching may have reached its mature phase and may have no sustainable prospects in the long run. On-line MOOCs seem to be doing very well in providing technical (video) instructions as well as practical opportunities for all who are interested in management accounting knowledge (See, for example, web source Martin, J. R. Not dated. Comprehensive Archive for Accounting Education, Research, and Practice. Management and Accounting Web. http://maaw.

info). The massive growth of online education may cannibalize on the student numbers participating in the "traditional" courses. Research on the effects of online education on the regular student numbers in accounting education is lacking. It may even become unsustainable in financial terms, meaning no longer attracting sufficient student numbers to continue its existence. On the other hand, university teaching based on personal interactive contact/instruction between instructor and students, and among students, does have a potentially added value. Releasing this potential, however, calls for a different approach, and different course objectives as well.

Second, specifically in management accounting, the interest of academia in the practical aspects of the discipline has waned, creating threats, for example, for the employability of the graduates. Although a relatively new academic discipline, management accounting has lost much of its practical relevance [2]. Until the 1950s, only 6% of the chapters of accounting books paid attention to its practical core, which is the decision making support role of management accounting. It was William Joseph Vatter who took a final chapter of John Neuner's cost accounting book as the core for a new book, which emphasized the managerial, as opposed to external, use of financial information, in the nineteen-fifties of the 20th century [3]. Academic attention for management accounting, visible in more scientific publications, resulted however in an ongoing neglect of both the technical application and the problems and issues that have a direct practical relevance [4]. There is a need for academic researchers to have a stronger focus on the technical core of the subject and to harness the findings of empirical research so that they can be used to develop and support practice. This development in scientific research has also caused education based on it departing from the field of practice and instead focusing more on theory development. In the end, the very practical field can only exist (be sustainable, have a long-term orientation), if it delivers graduates to the field with up to date knowledge of practice and academia, and if it continuously works on creating value for the relationship with the world.

Third, universities, as any other organization, struggle to give sustainability the place it requires strategically and operationally according to the promises stated in the Brundtland definition. As Gray [5] critically evaluated, "*sustainability efforts of organizations in general are far from genuine accounts of sustainability and are explicitly misleading appropriation of the terms 'sustainability'/'sustainable' to mean, typically, some friendly under-defined notion of (corporate) responsibility*". Probably one of the causes is a broad sustainability interpretation existing alongside and causing ambiguity of the concept. Dedicated sustainability departments and sustainability officers became complex, but isolated "siloed" functions with a threat of lacking the critical mass to create organization-wide awareness, knowledge, and commitment to sustainable operations. Multiple initiatives at all cells of the university are needed to develop sustainability awareness among lecturers and students [6].

These three challenges impact the sustainability albeit from a different perspective. First, how sustainable in terms of long-term prospect is current reductionist university teaching in general; second, how can management accounting teaching be conducted to satisfy high quality standards (i.e., educating knowledgeable humans capable of performing jobs in real world) with the ongoing trend of less interaction with practice becoming a fact nowadays; and finally, how can we educate economically, socially, and environmentally aware graduates prepared to face the complexity of interconnectedness and contributing to radical change in the world needed to save/serve our planet? The former two challenges concern the students' perspective in particular, affecting students' personal development and individual learning and future career opportunities.

In view of these three developments, we asked ourselves, how do we equip young people with sustainable skills for their lives? How can we make their learning about sustainability become sustainable? How can we teach to better sense and connect with a future possibility that is seeking to emerge? And how can we do so in the course advanced management accounting techniques'?

In this paper, we describe the result of our efforts to include sustainability in business studies in advanced management accounting techniques. The aim of the paper is to deliver instructions, ideas, and suggestions on the course to educators, while placing these instructions in a broader theoretical and sustainability development context. We gave voice to a new initiative. We decided to move

towards a different approach, in which sustainability is no longer a side issue, or even an integral part of the course, but the fundament underlying and permeating both the entire course and the way it is being taught in order to increase both a general, a business, and an accounting awareness of the importance of sustainability. This approach can be described by a mix of elements from different perspectives: post-formal thinking [6], critical pedagogy [7], constructivist connected teaching [8], and transformational integrative learning [9]. In that, we changed the earlier isolationist approach [10] of a regular management accounting course, with a written examination on a textbook and academic papers, and improved it in order to accommodate sustainability in one ongoing assignment on a specific accounting topic thoroughly related to sustainability. To our knowledge, the concept we describe has been unique and innovative, and has not taken place elsewhere in that particular set up. The Faculty of Economic and Business at the University of Groningen helped us with a query for a more practice-oriented management accounting course, although in that query, the sustainability was not considered as a core issue. We believe this course set up may contribute to returning to practice in a new, more sustainable way and treating pedagogical approaches in a more transcendental manner (there is no one best way to teach sustainability).

The structure of the paper is as follows: first, we describe the methodology of our paper; next, we briefly provide the theoretical foundation of sustainability and management accounting; after which we describe the current state of the advancement of sustainability integration in University of Groningen and introduce the concept and use of lemniscate approach as sustainable learning. Following that, we apply the theoretical foundation to the course and its assignments. We describe the approach, the outcomes, as well as the reflections from the stakeholders: students, instructors, program director, and master program advisory board. We complete the article with conclusions on sustainability integration learning and present future developments.

2. Methodology

Our research has been conducted along the lines of case study research, which is a particularly useful approach when a specific case within a specific context with relatively clear borders is studied [11,12]. Our study focuses on the development, the teaching, and the evaluation of one specific course for Masters students at one specific university. While the focus is one specific course, which is scrutinized in detail, the purpose of our case study is not merely to understand and illuminate this one case, it is also to use this specific case to provide further insight into the topic of integrating sustainability and teaching at universities. The case study focuses on the course advanced management accounting techniques, as part of the business studies curriculum, for which a new method of teaching was used in 2018 (see Supplementary Materials and Appendix A for the course case text, instructions and relevant material). In line with official university policy, and in a radical break with the former set up of this specific course, sustainability was changed from a side issue into the core issue underlying the entire approach to management accounting. Aiming at creating an awareness of the integral entwinement of general, business, and accounting issues, the course is the first in the faculty to take this approach, and might help to further advance our understanding of the dilemmas, practicalities, and challenges in integrating sustainability in business studies. In an interesting twist, the central topic of our case study, the newly developed course advanced management accounting techniques, is itself also based on a case study. Case study teaching has a long tradition in academic teaching, and is quite suited to topics that involve decision making in dynamic and complex situations, which include a high amount of ambiguity, uncertainty, and contrasting arguments, which we will discuss in more detail in the next section.

Our research for this paper has been conducted according to the standards of case study research, and triangulation was used to increase its validity, applying a set of different techniques to gather the data: documents, literature study, (participant) observation, and discussions with students and faculty and university staff. The documents used for our research consisted of the actual case study itself; the written business reports that student groups handed in after having finished the case;

the written evaluation of the students of the course; the university policies and guidelines on teaching and sustainability; and academic literature on sustainability, teaching, and management accounting. As both researchers were also the designers and instructors of the course that formed the object of research, (participant) observation was a particularly useful technique. Both researchers, students, and staff took part in this aspect of the research and provided useful data, both in the preparation phase of the course, the actual teaching phase, and the evaluation phase. In addition, discussion with faculty staff of business studies, design, and evaluation of the course, and with university staff on sustainability policy and sustainability and teaching, provided further data. Finally, investigator triangulation was employed, as two different researchers (the instructors) were involved in the study, differing both in gender and ethnicity (Polish and Dutch). Based on the documents, the feedback, the discussion with staff, and (participant) observation, we were able to further analyze the results of our course in order to determine its effectiveness in working towards our (and the university's) goal of integrating sustainability into teaching. Though the results may not be indicative of this process for other courses at other universities, in providing detailed descriptions of the first transformation of an academic course at our faculty, this case study may help us to further our understanding of integrating sustainability into teaching and the dilemmas and challenges one encounters in the process.

3. Theoretical Foundations of Sustainability

The departing point for exploring and defining sustainability is the conventional (and probably most useful) definition formulated in the Brundtland Report:

> *Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs* [. . .] *Development involves a progressive transformation of economy and society* [. . .] *But physical sustainability cannot be secured unless development policies pay attention to such considerations as changes in access to resources and in the distribution of costs and benefits. Even the narrow notion of physical sustainability implies a concern for social equity between generations, a concern that must logically be extended to equity within each generation* [13].

What is sustainability? Despite the apparent ubiquity of sustainability, it does not appear to be widely understood, nor its complexities fully appreciated [14]. 'Sustainability' is also an elusive and indeterminate concept. It can be defined (explicitly or by implication) in a wide variety of ways, only some of which are caught by the notion of weak versus strong sustainability [15].

The concept may certainly seem a floating one, allowing for multiple interpretations, and may even be an empty signifier [14]. Thus, trying to settle the epistemological status of sustainability is, in itself, a daunting task [5]. Organizations cope with this problem by reducing the concept and following one certain narrative: financial (e.g., sustainable cost, total impact accounting), non-financial (e.g., product life cycle, ecological footprint), or (performance) indicators.

More recently, in 2016, the 17 sustainable development goals (SDGs) came into force, which represent the global goals of sustainable development and aim to advance and ease the transformation towards sustainable operations. These SDGs are adopted by 194 member states of the United Nations and their goal is to balance the three dimensions of sustainable development: economic growth, environmental sustainability, and social inclusion. A broad consensus has been reached among academics that social and environmental issues cannot be separated from economic success [16].

The business world is recognizing its responsibility in these global issues. A new way of thinking is arising, in which companies do not only have responsibility for generating economic value, but also for generating environmental and social value [17]. Management accounting as "the language of business", which is the ultimate integrator of activities, methods, and systems to record, analyze, and report has a great and so far unused sustainable potential of revealing the following:

- environmentally and socially induced financial impacts;

- ecological and social impacts of a defined economic system (e.g., the company, production site etc.); and
- the interactions and linkages between social, environmental, and economic issues constituting the dimensions of sustainability.

According to the president of the World Business Council for Sustainable Development, Peter Bakker, "*Accountants will save the world*". Bakker states that sustainable performance in business has to be concrete, measurable, comparable, and linked to scientific priorities. The link between theory and practice in terms of sustainability requires more attention as so far, there are few examples of reducing the distance between research and practice [18]. There is a need for interaction/cooperation of academics with practice, addressing what accounting systems or techniques to use to accommodate sustainability, how to change management accounting practices, and addressing the potential shortcomings and inherent limitations [4].

3.1. Sustainable University

Historically, universities have played many roles in transforming societies, by educating decision-makers, leaders, entrepreneurs, and academics. However, education and research on sustainability in universities is at an early stage in many institutions. In spite of an increasing number of universities becoming engaged with sustainability, Lozano et al. [19] claim that most higher education institutions continue to be traditional, relying upon Newtonian and Cartesian reductionist and mechanistic paradigms with a primary focus on the conquest of nature and the industrialization of the planet, producing unbalanced, over-specialized, and mono-disciplinary graduates.

The concept of the sustainable university emerged to label a collection of transformations taking place at universities aiming toward more sustainable operations. A sustainable university is defined as follows: "A higher educational institution, as a whole or as a part, that addresses, involves, and promotes, on a regional or a global level, the minimization of negative environmental, economic, societal, and health effects generated in the use of their resources in order to fulfil its functions of teaching, research, outreach, and partnership and stewardship in ways to help society make the transition to sustainable lifestyles." [20] This rather broad definition leaves space for different interpretations, for example, is a university addressing sustainability partially and in a few courses then a sustainable university? Cortese [21] envisions such a university to operate as a fully integrated community in itself that models social and ecological sustainability and has an ability to spread this idea to the local, regional, and global communities in which it is embedded.

Van Weenen [22] described different efforts of sustainability universities, showing multiple developments. The analysis of different initiatives allowed him to develop a four-stage classification model for classifying the sustainable university. Starting from level 1, assessing university as an organization unit in terms of energy, facility, and space use in both downstream and upstream activities. Going to level two, where a university adds attention to its core activities: research and education. Level three, where university engagement pays attention to university management, engaging broad groups of stakeholders including non-governmental organizations and local communities, and provides training for the university management. Finally, arriving at level four, holistic engagement-developing mission and vision and translating it into actions including interest of local and worldwide groups of interest contributing to the university profile.

The University of Groningen is a socially responsible education institution and has made sustainability one of its core values. The Brundtland's definition of sustainability guides the vision, mission, and the strategy of the university:

> "*We integrate sustainability and responsible behavior consequently in our teaching, research, and administration. We believe that through cooperation between our students, staff, and other leading partners in sustainability, the university can have a true impact in creating a circular*

economy and a sustainable society". (https://www.rug.nl/about-us/who-are-we/strategic-plan/visions-and-values/values)

In 2014, the Executive Board of the university established the sustainability task force as a joint initiative of several action groups with the aim of integrating sustainability efforts throughout the organization. Also, the Green Office (http://www.greenofficemovement.org), as a student-led sustainability initiative to work next to the sustainability task force, was established in that year. In 2018, the Green Office hired a full-time sustainability coordinator next to several student assistants and runs a wide range of initiatives in three categories: people, planet, profit such as organizing Green Growth courses, symposia, activities, supporting sustainability summer schools, developing and communicating the environmental performance indicators with the University Board, taking an active role in procurement tenders, being CO_2 neutral in 2020, and creating broadly defined value. The number one sustainability goal with respect to education in research is now accommodated in a project to create a dynamic system for a real-time overview of the many present sustainability elements in both education and research; this project completion is planned by the end of 2018.

The plans and the ambitions for sustainability have been set out in the Roadmap 2015–2020. The Roadmap is published to inform, but also to initiate discussion/interaction with employees, students, and other stakeholders on the current and new ideas. "A better University, a better world"—that is what the university wants to achieve with its 14 sustainable goals (Figure 1). Working on various initiatives in order to achieve these goals, the university aims to create a broad support base for its sustainability ambitions in cooperation with as many stakeholders as possible.

Figure 1. University of Groningen (UG) sustainability goals on the Roadmap 2015–2020.

Sustainability is not limited to a single subject or discipline. The university encourages staff and students from all faculties to engage with the issues and dilemmas associated with this topic. As a result, sustainability is increasingly becoming a matter of course in the various teaching curricula:

1. Integrate sustainability in teaching curricula.
2. Improve communication with staff and students on the theme of sustainability by promoting and supporting events, symposia, lectures, and courses relating to this theme.
3. Encourage staff to maintain their employability and continuously develop their talents (each year, twenty-five percent of all employees use the services of Talent Travel and the Corporate Academy).

The University of Groningen scores number 11 on the new Green Metric list, a list of the 'greenest' universities worldwide. Despite (or maybe because of) the growth of the initiatives accelerated from

2014 on, it seems more efforts are needed to breathe the sustainability throughout the organization and to connect all stakeholders at the university.

Returning to the model of sustainable university of van Weenen [22], the University of Groningen can be placed somewhere at the beginning of the level two; although at management level, some efforts of creating connections are developing slowly as well (level 3).

3.2. Sustainable Learning

Sustainable learning provides a cure for several failures of a reductionist approach as comprehensively described by Zajonc [9]; failures to account for what are called externalities and symbolize tragic neglect of the interconnectedness between humans, organizations, and nature. Marglin [23] characterizes it as hobbled by an ideology in which tension between an individual and the whole, between self-interest and obligation to others, between materials and spiritual health, are replaced by a set of pseudo-universals about human nature. Doing so simplifies modelling, but at great cost.

Sustainable learning, as we understand it, thrives on a personal approach, offering space and a challenge, and creating a connection. It sources from critical pedagogy and responds to criticism of the neoliberal discourse around high stakes testing and standards based education, but it can react to the pressure that teachers face when attempting to engage their youth learning through learning strategies that are relevant, empowering, and academically supportive. Critical pedagogy helps us rethink the way we engage students and analyze forms of learning, and re-evaluate our theoretical framework and pedagogical practices [7]. In other words, it is education that "lasts" and enables the students to face new challenges independently. It is about knowing/discovering what to do, when you do not know what to do. It would train students not only to obtain course credits, but also to a build a self-reliant and responsible attitude that comes in handy when living, learning, and working. The employability potential for a graduate is an important element of sustainable education, and if a student has learned to face and solve complex problems at university, it helps in searching for and finding jobs, but also builds confidence in job interviews. Kincheloe and Steinberg [24] assert that human morality cannot be divorced from educational contexts; postformal teachers—"*see their role as creators of situations where students' experiences could intersect with information gleaned from the academic disciplines, the develop new levels of activity*" (p. 301)—assist students to examine explicit orders of knowledge, as well as to explore deeper implicit orders of personals and social realities (p. 306) [6]. Teachers also have instructional responsibilities, and are caregivers, role models, and ethical mentors. They aid students in this growth, uncover new talents through ongoing praise, frequent interaction, constructive comments and individual assignment choices, and human interaction in teaching [8].

Considering the complexity and ambiguity of the sustainability concept, the traditional instruction approach based on learning from the experiences of the past using major learning methodologies, best practices, and approaches to organizational learning may fall short in delivering the desired learning outcomes such as a wider view, accommodating broader goals, coping with complexity, and departing from reductionist perspective on business problems. By contrast, a more forward oriented type of learning, learning from the future as it emerges, invokes skills required to lead sustainable business [25]. Those skills are critical thinking, problem solving, creativity, collaboration, and communication, and are called 21st century skills [26]. The study of Soulé and Warrick [27] finds these skills lacking among new workplace employees, while exercised by current/seasoned employees. This so-called "skill gap" calls for an updated approach to education that includes practices for developing/practicing those skills.

In management accounting learning, the focus so far has been on what is based on hard systems thinking: narrow, linear, segregated, siloed, causal, and optimization choices, based on the positivist theory and quantitative methodology in contrast to accepting irrationality interrelationship, generative reasoning, creatively leveraging, opposing models in interpretative theory, and with use of qualitative methods. Oliver et al. [28] recognize the reciprocity between soft- and hard-integrated thinking in

implementing sustainability in organizations: coexistence of hard systems measures representing sustainability accountability and those that had emerged from a soft systems thinking approach expanding to the deeper ecological realm with a concern for natural resources, as well as social health and well-being. This coexistence and reciprocity need to find its way into learning to avoid the "siloed" education, focusing, for example, only on accounting techniques (hard thinking).

The floating concept of sustainability and the need for accommodating integrated thinking in a management accounting course can benefit from a floating learning process. The inspiration came from nature and the lemniscate judgement model for individuals working in teams [29]. Polarity and rhythm (floating movement between facts and ideas, goals and ways to meet goals, insights and decisions, and words and actions) characterize this process of the iteration between theory and practice, and recognize 'praxis' as important in learning [29]. The floating movement in learning proceeds along the lemniscate figure (see Figure 2). The Latin word "lēmniscātus" meaning "decorated with ribbons" and was used for the floral garland that a general who won a battle received upon returning in his city. One loop passing behind the head, the other laying in front of the abdomen, they crossed in the heart region. The garland embraced head, heart, and limbs, and was thus an expression of the three-fold souls of a person who can think, feel, and want. Later, the horizontal version of the lemniscate became widely used in mathematics symbolizing infinity.

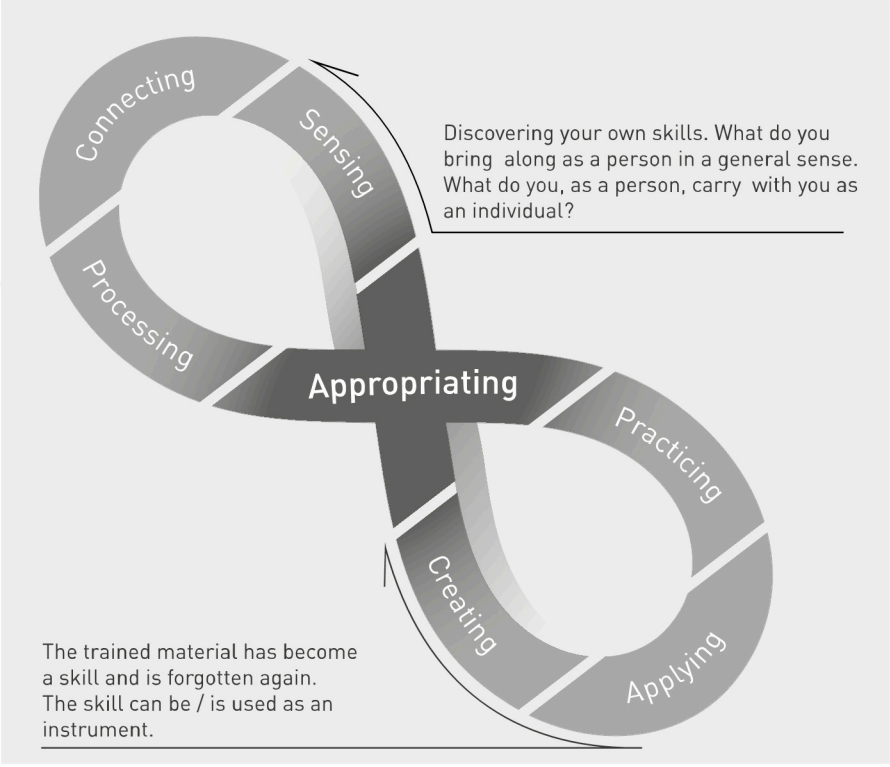

Figure 2. Phases of Lemniscate Learning process. Based on the literature [29].

Next to the aforementioned humanity viewpoint of the three souls (will, feeling, and thought), the lemniscate learning process includes following three viewpoints:

- Learning is a continuous non-linear process, without a definite end or beginning. Even if something is learned and becomes a skill, it is temporary; as the variables change, the skill needs to be continuously reviewed and altered.
- Learning resembles a breathing process, an interaction between inside and outside. What is outside (exhale) in one loop, is inside (inhaling) in the other, and vice versa.

- The result of the way of knowing/learning lies in me (new insights), while making choices lies outside of me (the world changes, when I execute my decisions). During the learning process, the observed facts are always outside me, while the thinking process that searches for the relevant concepts takes place within me.

The process has a clear intersection at the central crossing. All movements, both outwards and inwards, constantly find concentration in the crossing, where the (research) question lies. This crossing has something paradoxical. On the one hand, all movements through the four fields come to rest in this crossing. On the other hand, this crossing is the most dynamic element of the concept. The most important result of the learning process is the reformulation, the transformation of the original question. The discovery that this question is actually not a question at all, or whether there is a much more substantial question behind the initial one or that an apparently detailed sub-question seems to be the core question. Knowledge creation and the choice path originate here from the middle in finding the real question, and when found, the answer is usually very close.

The process has seven phases consciously evolving one from another; it has no beginning and no end, and can be thus entered and exited in any phase.

1. SENSING: encountering the problem to be tackled, evoking lively interest in the problem and its context; the student has to say "yes" within him/herself to what s/he meets
2. CONNECTING: developing own unique relationship to the problem, disassembling the problem matter in a variety of ways; researching it, studying theoretical models, course book scientific literature on the subject
3. PROCESSING: developing unique individual solution strategy to the research question, implementing student's own working method
4. APPROPRIATING: awakens in his/her actions or approach, discovering the ability to solve the problem inside yourself, arriving at the choice of a solution
5. PRACTICING: practicing until the sensed strategy "how" is forgotten, prototyping and reflecting, discussing the choices made, presenting arguments
6. APPLYING: solving the problem, answering the question, practiced solution becoming the instrument that can be used in the wider world
7. CREATING: the solution is fully at the service of the student, dealing it with freely, becoming an expert in the field

In performing the phases in a floating manner, with no beginning and end, while assisting students with instructional and team members support, the learning generates insights that are long-term oriented, and can take a root and hold on for a long time. The concepts move from short-term working memory to long-term memory and become deep-seated knowledge [30] that is sustainable learning. In the following sections, we describe the course set up and conduct illustrating how the lemniscate phases guided us in creating a sustainable learning experience.

4. Sustainable Advanced Management Accounting Course Set-Up

The graduate course Advanced Management Accounting is a core course and scheduled first in the Master of Business Administration specialization Organizational Management Control program at University of Groningen. The course is elective and open to other programs as well outside the faculty of Economics and Business, for example Psychology, Medicine, and Physics. The course is taught twice in each academic year (winter and spring semester) and has on average 80 students participating yearly. There were 16 students participating in the course we describe here in spring 2018 (see Appendix B for an overview).

As indicated in the introduction, our main challenges were incorporating economic, social, and ecological dimensions in a course on management accounting techniques, and to do so in a learning environment where students would not merely learn, but where they would be able to apply

their knowledge and be challenged to question more traditional approaches to accounting techniques. The structure of the sessions, the case assignment, as well as the evaluation criteria work through the phases of lemniscate learning, although they do so in a different manner.

4.1. Evolution from Traditional to Sustainable Course Set-Up

The Masters course management accounting techniques were originally taught and examined in a traditional manner. Based on a handbook, namely Advanced Management Accounting Techniques, separate chapters were discussed in a series of seven sessions, students were assigned specific exercises based on these chapters, and the students' knowledge of the material was tested on an individual basis at the end of the course in a written examination. Additionally, students worked together in groups of four in order to write a paper on a topic of their choice related to accounting techniques, for which they were also graded. The written examination constituted seventy percent of the final grade, and the paper thirty percent. With the growing interest and commitment to sustainability by the university, as discussed before, we decided to incorporate a session on sustainability and accounting, which was based on selected papers on the topic.

However, as the university seemed to indicate that sustainability should be more than a mere side issue, but should rather be integrated in the curriculum, we decided to re-evaluate our course entirely. The general idea behind this was to create an approach to management accounting that would integrate the challenges and dilemmas that sustainability poses for accounting. Our objective was to do so in a way that would challenge students to engage critically with accounting and sustainability, not just in one of the sessions of the course as a separate topic, but throughout the entire course. After a couple of brainstorm sessions, we had worked out a curriculum, and decided to give it a go.

The basic concept behind the course management accounting techniques is a case assignment that runs through all the seven sessions of the course. The students work in groups of four on this assignment and are evaluated on the basis of the report they produced in the course of the sessions. Next, we will discuss the elements of this case assignment, and discuss the following: (1) how it addresses the accounting techniques; (2) how these are integrated with sustainability, on an economic, a social, and an ecological level; and (3) how we aimed at challenging students continuously to ask themselves to what extent sustainability issues were incorporated in management accounting, where possible dilemmas presented themselves, and how these could be addressed.

4.1.1. Case Assignment in the Course as a Collection of Problems to Address

The case assignment that we were using in the 2017/2018 academic year was based on the development of a hotel. The students received a case description at the start of the session, in which Julia Deere, a graduated RUG (University of Groningen) alumnus whose family has a long tradition in hotel management, wanted to enter into the hotel business. She is developing a business plan for her future company in the hospitality industry with a firm sense of corporate and ecological responsibility. While Julia knows a lot about marketing and the technical and logistic aspects of the hospitality industry, accounting and financial planning are not her forte. The students are her advisors in this aspect and have to prepare an advisory report on accounting and financial planning. Julia and the student advisors are colleagues/peers from the same university and are close in age initiatives connecting to the business research problem. It is easier to understand and see the problem of somebody you (might) know than a problem of CEO of a large company far away. In addition, the aspect that students are helping their colleague enhances the connection to the subject.

Before the sessions started, the students were provided with some basic information on the hotel that Julia will be working with; it is an old complex on a piece of ground amid the forests, rivers, and lakes on the western edge of Poland. Her grandparents bought the complex and are willing to let Julia have a go at it. The hotel borders on the edge of a small lake; the area is crisscrossed with walking and cycling routes. On the site of the hotel is a well from which pure water can be drawn from. The vision of Julia is for the hotel to become a niche player in the hospitality industry, focusing

on the wealthier section of the market, both new rich and old rich. Her customers would be willing to pay extra for accommodation that would cater to the growing needs for spiritual depth and a healthy lifestyle in a rapidly changing and demanding environment. Julia aims not only at offering accommodation, but also a sense of 'connectedness to the inner self'. Of course, her hotel is to acquire the Green key certificate, an international label for sustainable hotels worldwide. We further supply the students with specific details on the number and types of rooms, the available conference rooms, restaurant, bar, and financial data that the students can use as a basis for the case assignment in an Excel file. These data are a starting point, and student groups will regularly be required (and encouraged) to find and use additional data. The sensing phase—encountering the learning material—started prior to the kick-off of the course.

4.1.2. Learning Approach in the Course

In the course of the seven sessions that are available to us, we had to address accounting techniques (hard thinking), let students learn how these were integrated with sustainability, and do so in a way that would confront students with the challenges and dilemmas that this combination would inevitably present (soft thinking). During our kick-off meeting, we would be addressing these three aspects. First, we provided the students with a brief overview of management accounting aspects that we would address during the course (sensing the subjects): CVP (Cost Volume Profit) analysis, financial modelling, cost estimation and budgeting, full cost accounting, transfer pricing, interorganizational management control, and reward systems in organizations. Next, we discussed how our course would focus on a practical case and how these aspects would be discussed and worked out through this case study, with Julia's hotel and her vision, which was very much centered on sustainability, at its core. All these allow students to develop a desire to connect to the research problems, as they will emerge during the course. Finally, we explained to the students that during this course, they would often be confronted with lacking data; limitations of management accounting in relation to bounded rationality of decision makers; and dilemmas on, for example, the impact of adhering to the vision of sustainability in the face of economic requirements. In that it corresponds to the creating phase in lemniscate learning, the students are expected to develop their own solutions to the problems (create and communicate those with colleagues and us). We explained to them that, rather than simply applying management accounting techniques in a specific and given context, they would be confronted with imperfect information or even ambiguity of future conditions or outcomes, which might complicate their decision-making during the requirements of this specific case study.

During the first session, too, the groups were formed, and rather than allowing students to choose themselves, we had the students fill in a brief questionnaire on the preferred team role (https://www.123test.com/team-roles-test/) and their previous education, which was followed by a short in-class discussion about their professional interests (i.e., strategic versus operational, financial versus non-financial), on the basis of which specific skills, mindsets, and learning traits of students could be determined. In order to allow for a multi-sided approach to what is, in essence, a very multi-faceted case study, we composed the groups based on the results of the questionnaire and the resulting variety between students (see Appendix B for the overview of the participants and the characteristics considered).

During the remainder of the first session, students had to cope with uncertainty in decision-making, as Julia was considering investing in solar equipment for her hotel. On the one hand, this allowed students to explore decision-making and uncertainty, for which we stimulated the use of the Hurwicz alpha, while at the same time, they were stimulated to calculate profitability scenarios with solar energy (processing and practicing). At the same time, the students would have to take the vision of the hotel into account and weigh the less easily quantifiable advantages of investing in solar energy (applying and creating). In that session, the learning passed through all seven phases of the "lemniscate learning". To some extent, a similar approach was used in the remaining six sessions of the course, although it was never our aim to fix using the approach and following all phases in one

session. As the course advanced, more activities took place in the applying and creating phases as more complex problems were introduced. Next, we describe the content of the other six sessions.

During the second session, students were required to include scenario analysis and financial planning. For the case study, this meant that questions regarding room types, investment in possible upgrades, investment in material specifically geared to ecological aspects of the hotel industry. As the students were allowed a fair amount of freedom, this would result in creative solutions to obtaining the Green Key certificate and thinking of ecologically responsible management of the hotel. At the same time, the students would have to consider the effects their decisions might have on room occupancy, and also calculate the effects many of their decisions would have, both by using a sensitivity analysis for different levels of marketing, room prices, and demand, and by setting up a five-year profit and loss account and financial statement.

The third session, from a traditional management accounting perspective, would logically follow on the second, as it related to cost and budgeting. Not only would the students prepare a cost classification overview, they would also be working with activity based budgeting. The students would, for example, explore the relation between cost drivers, learning, economies of scale, revenues, and the effect that the vision of the hotel might have on this interplay.

During the fourth session, a performance management system would be set in place for the hotel, with the sustainability vision and the ensuring strategy of Julia's hotel at its core. They could, for example, but not necessarily, employ a type of balanced scorecard in which financial, customer, internal business process, and learning and growth are interconnected, as long as they take the vison of the hotel into account in all of their decision-making. Internal business processes, for example, could focus on electricity, gas, and paper usage, and students are encouraged to go beyond mere objectives, measures, and targets, but also to consider initiatives that would further enhance the sustainability core of the hotel, and the impact these would have on the customer and financial perspective.

Next, we used a session in which the full cost approach (true cost) is discussed and employed for this hotel. By specifically internalizing the external effects of the hotel, students are encouraged to think about the costs (and revenues) for the direct environment of the hotel and society, and to calculate how these costs might be integrated. This way, the responsibility of the specific business for the wider community would be integrated directly into the accounting process. We ask students to think and work out scenarios that are relatively easily quantifiable, such as CO_2 emission, energy reduction, food waste reduction, or hot water consumption, but also less easily quantifiable effects and initiatives, for example on a more social responsibility contributing to the local community by working with different type of workforce: volunteers, minority groups, and so on.

In the next phase of the case study, the hotel has grown and is aiming to expand beyond the borders in a couple of other European countries. As transfer pricing is an important topic of discussion—not only in management accounting, but also as related to public responsibility and ethics, for example, by the use of structurally low profit in high tax rate countries—this is one of the aspects we zoom in on. The students are not only asked to calculate how transfer pricing and the arm's length principle can be used to allocate profits to different countries. They are also encouraged to consider the effect that these decisions might have on the corporate image of the hotel and on the social responsibility that the hotel aims at achieving in its sustainability approach, and whether this might result in different transfer pricing decisions, which might also affect costs and revenues.

Finally, the case study takes the expansion of the hotel across the seas and into the Caribbean. On a small island, with a postcolonial setting, a hotel is started. Students are required to decide on foreign entry mode, on management accounting and control, and rewards systems and apply these to the specific context. At the same time, the students are asked to consider these decisions within the framework of the specific effects that their hotel would have on the small island community. Students need to take not only the ecological aspects, but also the social aspects of sustainability into account and consider how they can be a trustworthy partner, not only for the visiting tourist, but also for the population of the island, with its specific culture and history.

At the end of the course, the student will hand in an advisory report in Word, as well as an Excel file with all the calculations that support the report. While these calculations are based on the initial data that we provided, the students will add data in the course of the case study, which will build on each other. The advisory report will be approximately 5000 words, excluding references and appendices, and while the Excel file as such is not a part of the report, the students are allowed to include tables or figures that are based on their calculations to support the argument. The students are awarded 80 points for the Word report and the Excel file. Another 20 points can be earned by effort and participation during sessions and a few small, individual assignments. The instructors measure effort on a weekly basis and students themselves also evaluate the peers in their groups in order to determine how cooperative group members are and how significantly they contribute to the report.

The final part of the course is the individual reflection survey taken online (The online survey is presented to the students in secured Blackboard Learning Environment using Qualtrics tool for building on-line surveys available at University of Groningen.) (Appendix C). The survey consists of 10 quantitative questions and 2 open essay questions on the case assignment and the course in general. We use this reflection as input for future changes in the course, but also to see how students experience this new unusual learning approach.

5. Conclusions and Future Developments

At the outset of our paper, we introduced three main challenges that universities face: (1) MOOC developments and the need for universities to focus on an approach based more on interactive contact and instruction; (2) the necessity to connect science with practical aspects; and (3) the need to integrate sustainability in all its aspects in its curriculum. Aiming to translate these needs to the specific course of advanced management accounting, we moved away from the traditional approach, which we had used so far, and which was text-based, using a handbook and papers, and rounded off by a written examination. Instead, we developed an ongoing case study, with ambivalent and conflicting dilemmas in which sustainability moved from being a topic addressed during one of the lectures to the central vision of the case, the strategy, and the management accounting. In this development, we applied theory from sustainability and sustainable universities and learning, including the lemniscate learning processes. Further, we coordinated with our university on the sustainability policy, to assist us in creating a complex, ambivalent case study, forcing the students to grapple with sustainability on a social, ecological, and business level in order to instill in them a general, a business, and an accounting awareness of the importance of sustainability. Next, we discuss in more detail the results of our new approach, the feedback we received on the course from both students and other stakeholders, and the steps that still have to be taken, both on a faculty and university level, regarding the development of a sustainable university, and on a course level, in order to further improve our teaching sustainable management accounting during the next session in September 2018.

In starting this new approach to sustainability and management accounting, we were confronted with both positive and negative comments. From the perspective of the students, we received mixed comments. While the course was evaluated in general as "very good", the specific qualitative comments of students were more enlightening. They were positive about the connectedness of the case study as such: "*I liked the fact that a lot of the questions were related to each other, which forced us to work together and really think about the decisions we had to make.*" In addition, they liked that the course was not exam based, but was focused on a specific case study and the application of techniques: "*I honestly liked that it wasn't a standard course of learning the book and then doing a test. Still, I think I spent more time than on a regular course where you just have to take an exam. What I noticed was that I spent more time without it getting boring.*" The fact that there was not one specific solution to any given problem, but a plethora of possible answers to address the topic also seemed to stimulate students: "*I learned to work in a team and value the input of other team members, because for this particular course, there is no wrong or right answer, no clear-cut way to do things, so we had discussions and feedback to help us all decide what we wanted to do and what not and how.*" Not every student liked this 'freedom' equally and one student responded: "*I didn't*

like that the assignments could be interpreted in different ways." Another point of criticism was related to the small, individual assignments: "*The thing that I liked less are the small assignments. They were too trivial and you had to invest a certain amount of time in them.*" From the point of view of the organization, we received mixed signals. On the one hand, an approach in which sustainability was incorporated was considered positive, as was our practical approach to the topic by way of an adapted real-life case study. However, there were also worries that were caused by the criticism of few students on the fact that ambiguity and contradiction formed an essential element of the course, and there were also worries at the faculty level as all students passed the course, which is quite uncommon. Later, fortunately, we received a formal letter from the program director with acknowledgement of our efforts in building the course in this new approach.

The Advisory Board of the MSc BA track Organizational Management Control, consisting of representatives (mostly business and financial controllers) from business organizations, appreciated the integrated sustainable approach focusing on developing not only analytical skills, but also more personal skills. The Board prizes our course for creating an opportunity to develop skills that allow for life learning and better job opportunities.

To some extent, we are addressing the less positive points from the evaluations, as we are considering removing the small assignments, and to some extent we were somewhat in doubt, because the ambiguity of the case study is part and parcel of our approach to the topic of sustainability and accounting, and most students actually appreciate the approach. We have thus decided to make it more clear to students at the start why this approach is chosen for the course. What surprised, and somewhat disappointed us, was that neither the students, nor the organization (University of Groningen) actually commented too much afterwards on the integration we aimed at achieving between accounting and sustainability. For us, this meant that we would have to be even clearer to students about the focus of the course and the essential part that sustainability plays in the case study. It would help if the curriculum on which the entire education within the faculty is built would also aim at incorporating sustainability as a central element of the specific courses that are being taught. For a university that prides itself on wanting to integrate sustainability within its curriculum, this might seem obvious. Reality, however, is less forthcoming, and so far our course is the only one that fully incorporates sustainability within its course. Now that is a discussion that would be far more interesting than a discussion on the fact that all students passed the course.

Similarly, the aspect of our course on enhancing engagement between science and practice by educating students connected to the world was highly appreciated by the students, but received little appreciation/no attention from the faculty. There is an unused potential here to develop this aspect and create sustainable added value for all stakeholders—through valorization of knowledge [31].

Probably one of the most valuable conclusions from this approach is that it is very hard to finish the course for students who aim only at merely a "pass" on the course and are not willing to learn or invest an effort corresponding to the credits granted for the course. In that, our course has a "natural" mechanism mitigating free-riding. Those students find it hard to connect with the question. Only with the team's joint effort, instructors' attention, and the continuous learning approach, they finish the course with success.

The lemniscate learning shows flexibility in use throughout the course; in some sessions, we addressed a few phases, in others only one, some sessions focused more on communicating applications and others more on appropriation or practicing techniques. It was easily suited to the three-hour time slots available to us for the course each week. As long as we keep in mind the continuity of the learning process, it will deliver its results. It can easily be applied to a new case assignment, in that our course set up is sustainable in the long run. It saves efforts of the instructors, as the course data delivers sufficient variability in the course across the academic years. We consider changing the case data and description after one term it in that is easy to create continuity of the learning approach and the ease of translating the approach to a new situation.

With this course, we moved towards a different approach, in which sustainability is no longer a side issue, or even an integral part of the course, but rather is the fundamental underlying and permeating both the entire course and the way it is being taught in order to increase a general, a business, and an accounting awareness of the importance of sustainability. We made the learning process continuous with the use of lemniscate learning, which contributes to life-long learning. We also initiated a closer cooperation with the Green Office of the university to enhance learning in our course as well as to help advance sustainability at university level.

One of the visible effects of this cooperation are two projects on advancing sustainability at university and faculty level starting in September 2018; one short 10-week multidisciplinary project to create a strategy map for university sustainability goals. We (as lecturers but also our students, course participants) are also invited to join the discussion and the decision-making. The other project will consider exploring the possibility for advancing the sustainable university as a concept at university level and will be performed as an undergraduate academic internship project.

"Sustainable university" does not emerge overnight and/or through separate and isolated projects, which may be vulnerable to risks, as can be seen in, for example, the radical termination of initiatives as an effect of changed budgeting priorities at the university level elsewhere [22]. By creating good courses and cooperating broadly with multiple stakeholders, this renewal train cannot be held against with one argument. We believe the conduct of the course in which theory meets practice, creating a sustainable learning experience with connections across the university departments described above, is an effective manner of advancing sustainability and making the world a better place. Despite the advanced efforts towards sustainability at strategic level, the operational practice seems more refractory; some stay anchored to the past, that is, perceiving sustainability as a new subject in a course. Here, we showed a working example of sustainable learning, both context and approach wise, which may be the key to transforming university teaching towards a sustainable future.

With regards to the MOOC challenge, we may conclude from the remarks and reflection from students, that there is an obvious need for face-to-face education when integrating sustainability in the course. With our approach of two lecturers teaching the course jointly and presenting students with interesting academic discussions, dilemmas, ambiguities, and ethical and moral issues, and reflecting and evaluating in a more holistic manner (will, feeling, and thought), we create what we call in business administration "sustainable competitive advantage" [32].

This paper is a case study on the development, the teaching, and the evaluation of one specific course for Masters Students at one specific university. As such, our study shares the general limitations of case study research. Although the focus is on one specific course, the results may be helpful to provide further insight into the topic of integrating sustainability and teaching at universities. Although strategically, many universities advocate sustainability, actually transforming a course can be both challenging and rewarding, as our findings indicate, but can also provide obstacles at staff level. With our study, we aim at providing further insight and inspiration for researchers, teachers, and staff in ways of integrating sustainability in academic studies. There is a need to fashion reflective, compassionate, and politically and socially sensitive teachers. Few issues are adequately treated from a single disciplinary perspective, and the lively engagement of two or more colleagues who tackle an issue demonstrates this truism repeatedly. For this to be truly integrative, the faculty needs to exemplify integrative understanding through ways in which they connect diverse fields into a comprehensively integrated whole. Originality does not respect disciplinary divisions, and the solitude of specialization often reflects a wider disconnection from others. In the field of sustainability, one becomes keenly aware of this. The wish to comprehend leads us to develop methods of inquiry directed towards reliable knowledge, for example, learning by identification, awakenings, and compassion [8,9]. With our paper, we hope to have provided a case study on both sustainability and learning, and hopefully, to have provided inspiration for others to walk this path with us.

Supplementary Materials: The following are available online at http://www.mdpi.com/2071-1050/10/8/2803/s1. Two case files are complement to the article: Course Case material text added in the Appendix and separate Excel file including starting data for the course.

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Conflicts of Interest: The authors declare no conflict of interest.

Appendix A. Course Case Text

Case Exam Assignment for Management Accounting Techniques EBM057A05 2017/2018.

Case Text

Julia Deere is a graduated RUG alumnus of the Marketing Master. Her family has a long tradition in hospitality management. Julia, despite the fact that she did different marketing jobs and internships during her study, wants to continue the tradition. Equipped with her young mind and open to innovative ideas, she is developing a business plan for her future company in the hospitality industry, a new hotel, with a firm sense of corporate social and ecological responsibility. Julia knows a lot about marketing and about the technical and logistic aspects of the hospitality industry, but accounting and financial planning have been obstacles during her study. She really hated this and promised herself to forget about it once she finally scored a sufficient grade after several exam trials. She thinks there will always be somebody (a friend) who can "(ac)count" much better. Now, imagine that you are the ones asked to equip Julia with financial and accounting planning, so she can talk to her large, wealthy family about her project.

The Description of Julia's Hotel

Julia's grandparents have purchased an old hotel complex at a favourable price on a piece of ground located on the outskirts of a very small, picturesque village, amidst the forests, rivers, and lakes on the western edge of Poland. The hotel is situated about 15 miles from the border of Germany. Her grandparents are willing to let Julia have a go at it. (Assume Julia's current financial situation is similar to yours. Describe it, but keep it simple. All the capital budgeting issues in this case must be simplified—ceteris paribus. Capital budgeting is being elaborated more in depth in the next course you will follow in the MSc BA Organizational Management Control (OMC) program, namely "financial management" lecturer Sandra Tillema. Your questions on that as well issues arising can be clarified in that course.) The hotel borders on a small lake (fishing, swimming), and the surrounding area is criss-crossed with cycle and walking routes. On the site of the hotel is an old well from which pure

water can be drawn. Additionally, there are good road connections to larger cities in the area in Poland and Germany, such as Berlin and Poznan.

The hotel must become a niche player in the hospitality industry, focusing on the wealthier section of the market, both new rich and old rich, who would be willing to pay extra for accommodation that would cater to the growing needs for both spiritual depth and a healthy lifestyle in a rapidly changing and demanding world. Julia aims at offering not only accommodation, but also a sense of 'connectiveness to the inner self'. Of course, her hotel is to acquire the Green Key certificate, an international eco-label for sustainable hotels worldwide.

The hotel currently has 60 rooms; 2 conference rooms, one for 60 and one for 40 persons; a restaurant (seating 100 persons); and a bar. Additionally, there are 30 one-bedroom cottages, and 20 two-bedroom cottages on the grounds. Julia has collected some data that is delivered to you in an accompanying Excel file. Use the data to develop advice using the points below as a guidance. Use course book knowledge to perform the analysis. You are free (and in fact encouraged) to use any additional data or literature. Do not forget to mention all the references.

1. Effect of the uncertainty in decision making: How are you going to cope with uncertainty? We do not know whether Julia is an optimist or a pessimist. Show where the Hurwicz Alpha point would be, which would decide whether to take more or less risky options in financial planning or investment (you can check your life optimism ratio using the LOT (Life Orientation Test) survey to visualize the results). Use this for a decision on investment in solar energy and its effect on company profit.
2. The rooms in the hotel are currently standard rooms. Julia is considering giving the rooms an upgrade to better reflect the awareness of body and mind that she aims for. These upgrades would cost XXX (This is up to your consideration. We publish additional file "Cost-Estimating-Guide.pdf" with overview of the renovation costs—you may make your own team selection of it.) euro per room, and the price of the room would be raised by 10%. Julia expects occupancy rates for the new rooms to be the same in the first year, but these may change in the following years. Prepare scenario analysis for two options with two different room types, highlighting changing cells.
3. Financial planning: Make a financial planning for the first five years of the hotel's operations.
4. Demand and price sensitivity: Prepare a sensitivity analysis for different levels of marketing expenses, room prices, and demand for hotel rooms (use a 20% threshold).
5. Classify and estimate costs: Prepare a cost overview with the cost classification. Discuss the functional form of the cost function and the best suited cost estimation technique, and show the cost model for learning.
6. ABB budget: Prepare a budget using the activity based budgeting (ABB) technique. Discuss the advantages and disadvantages of this technique in this case.
7. Performance management system: Prepare a multidimensional performance chart (include performance chart here) that Julia could use to manage the hotel's results—specify leading and lagging indicators when using BSc or Nests for Tableau du Board.
8. Internalize externality costs: Make an overview of the full cost approach (including the externalities)—conceptual and numerical. How does incorporating the full cost approach influence the competitiveness of the hotel. What would be your advice? Suggest and provide concrete arguments to match Julia's specific vision and ambitions in the hospitality industry. Develop sustainable key performance indicators (KPIs) to monitor and accomplish that ambition.
9. Transfer price (TP): After a successful start in Poland, Julia wants to expand her activities across the border and she aims at setting up a chain of hotels according to the same concept, starting with hotels in two other countries in Europe. She has found useful properties in Czech Republic, Ukraine, Lithuania, and Germany. In which two countries would you advise her to start, and, once realized, would the transfer price concept be applicable in this case? Describe arguments

and inform about the conditions and challenges for TP to apply. Consider, for example, aspects such as tax rate, intercompany services, management fee, use of intangibles, and arm's length aspects. Illustrate this with an example calculation.

10. Assignment based on Chapters 11 and 12: As you are aware by now, the book repeatedly points out the limitations of management accounting in relation to bounded rationality of decision makers, imperfect information, and uncertainty or even ambiguity of future conditions or outcomes. Near the end of the book, these limitations become more profound. Therefore, in the next section of the case assignment, you will have to deal with a decision of Julia, which will force you to deal with these uncertainties. After establishing and consolidating her chain of hotels in Europe, Julia seeks to further expand by exploring the Caribbean market. Julia remembers from her university days in Groningen, that a few small islands in the Caribbean are part of the Dutch kingdom, where they speak Dutch, and she decides that the tourist island of Curaçao might be the perfect stepping stone for further expansion in this region. She asks you to present a plan on how to enter the Curaçaoan market, which inter-organizational management controls to apply, and how to set up an effective incentive system. Use approximately 1500 words to report on Julia's request, and rather than merely reproducing theory, make sure that you apply the theory of Chapters 11 and 12 to the specific context and business case (note: these 1500 words are part of the total of 5000).

Some additional remarks: In the Word report, you comment on the findings as developed under the points above and provide concrete suggestions for Julia and her hotel operations. You need to reflect on all points above. You do not have to do it point by point, but for the evaluation review purposes name to which points you refer in the text, You can do it by giving headings (referring to the content not the technique) or giving the numbers in the margin so as not to disturb the logical flow of the text. You need to analyse your findings and reflect on the quantitative solutions. This means that, for example, if it occurs that the financial planning for five years (under three) does not create positive income, then you need to think of and suggest a solution to that problem.

Case INSTRUCTIONS

In this assignment, you will work out a case and write a case report. You work in teams of four students.

The objective of the assignment is to develop comprehensive management accounting advice for a company in the form of a written report. The inputs needed are relevant data collection (financial and non-financial), processing and analyzing information, and applied accounting techniques with Excel software as an instrument to build comprehensive advice on hypothetical business operations.

You need to deliver two files: a case report (Word file) and corresponding calculations (Excel file). Both files will be used for evaluating your result according to the evaluation form presented further in this document. Your group's output will be evaluated, provided you manage the division of work division fairly and efficiently. If serious and grounded concerns arise (timely) about the way the group cooperated on the report, the lecturer may decide to grade the report based on individual work, and an individual grade may be applied (see the Study Guide of the course for detail).

The calculation part of this assignment needs to be performed in Excel and delivered in an Excel file in an organized manner using the relevant techniques as described in the course book. It is important that each question/issue is prepared in a separate worksheet. You may utilize the templates for solutions as published on the Nestor site for the weekly assignments of the course to prepare your analysis. Information (as part of the solutions in Excel) that is essential to argue your advice needs to be placed in your case report in the form of a table and/or graph. The case report must be comprehensive and understandable as a stand-alone document. The Excel calculations are provided as an in-depth analysis and additional explanation. The report must be written in English.

Give a name to your group and use it as a name of the file you will submit at the deadline, follow the example Apple_Group1. The reports must be submitted digitally. The Word report must be submitted through Ephorus, the Excel file must be submitted through regular assignment; both in Nestor.

The deadline to deliver the report is 27 March 2018, 24.00 h

Reports delivered after the deadline will be reviewed in the second resit round.
The required Word report lay-out is as follows:

1. You work the assignments out in Word. The interpretation and the calculations are under each point.
2. This is an open book assignment. You can use any source of information; the literature in the course book and articles are compulsory.
3. You are advised to use additional literature or data sources if it enriches your advice (it will positively contribute to the final grade).
4. Mention all the sources and literature in the reference list.
5. We expect the Word file to be approximately 5000 words.
6. Mention your personal data (name, address, student number, and so on, and the time that you committed to finish the report) at the end of the report, after the literature and other references.

Assessment criteria for the Word and Excel part:

1. For this report, you can acquire a maximum of 80 points (the criteria for points are explained):

    a. 20 points for the lay-out (e.g., neat edition, complete references, both parts comprehensive and readable, no mistakes)
    b. 30 points for the Word report (e.g., the quality of the advice; the strength and to the point argumentation supported by the literature, i.e., course book, course articles or others; concise answers organized in easily understandable (for the reader) manner; comprehensiveness of the solution in the report)
    c. 30 points for the Excel calculation part (e.g., correctness of the use of the accounting techniques, application of the Excel tools, formulas, additional analysis suggested and performed correctly).

The Word reports will be scanned for plagiarism. Avoid quoting the literature literally, but refer to it and rework/use it to apply to your solution; this will help to avoid suspicions of plagiarism.

Appendix B

Table A1. The student's group description in course semester 2 Spring 2018, including the link to the team roles' test.

Case Team	Previous (Undergraduate) Education (Expertise)	Current Master Program	Country of Origin	Team Role [2] First	Team Role Second	Team Role Third	Gender
1	Premaster Business Economics	MSc BA OMC [1]	The Netherlands	Explorer	Team player	Driver	M
1	BSc Business Management	MSc BA OMC	The Netherlands	Executive	Analyst	Driver	M
1	Premaster Accountancy	MSc BA Controlling	The Netherlands	Driver	Executive	Analysts	F
1	BSc Applied Physics	MSc Applied Psychics	The Netherlands	Explorer	Innovator	Driver	M
2	BSC Business Administration	MSc BA OMC	Curacao	Team player	Executive	Explorer	F
2	BSc Economics and Business	MSc BA OMC	The Netherlands	Completer	Executive	Analysts	M
2	BSc Business Management	Accountancy and Controlling	The Netherlands	Analysts	Chairman	Explorer	M
2	BSc Business Psychology/Internship	MSc BA OMC	Germany	Analysts	Executive	Chairman	F
3	BSc minor Controlling	MSc BA OMC	Vietnam	Executive	Explorer	Analyst	F
3	premaster HBO IB & Arts (Philology)	MSc BA OMC	The Netherlands	Driver	Executive	Analysts	F
3	BSc BM/Accountancy & Controlling (double track)	MSc BA Controlling	The Netherlands	Expert	Executive	Innovator	M
3	BSc Accountancy & Controlling BSc Psychology	MSc BA OMC	The Netherlands	Innovator	Analyst	Team player	M
4	Premaster Accountancy	MSc BA Controlling	The Netherlands	Executive	Innovator	Chairman	M
4	Master Energy Engineering	MSc BA OMC	Germany	Team player	Chairman	Executive	M
4	BSc Business Management	MSc BA OMC	The Netherlands	Analysts	Driver	Chairman	M
4	BSc Accountancy & Controlling	MSc BA OMC	The Netherlands	Innovator	Team player	Executive	F

[1] MSc Business Administration specialization Organizational Management Control (OMC). [2] There are many team roles tests. We used the one that is free available at https://www.123test.com/team-roles-test/. M—male; F—female.

Appendix C. Management Accounting Techniques—Reflection Survey

INTRO

Dear Students, the final step in the case assignment is a reflection activity. We ask you to reflect on your learning and working process during the course. Providing the reflection is obligatory and on-line submission is sufficient. You do not need to copy the answer into your case report. Now we ask you to reflect; please fill in the form online individually. We will analyze the results and deliver the summary of the results to you via Nestor. Reflect on your learning experience on the following aspects: 10 stars is a maximum rating that can be given, 1 star is a minimum.

Now we ask you to reflect; please fill in the form online individually

Questions

1. This course helped to increase my insight in applying theory to practical situations.
2. It was clear what your tasks were in the case assignment
3. How interesting was the case assignment to you before you started working on it (after the introduction)?
4. How interesting was the case assignment to you after you completed it?
5. How do you rate the feasibility of the case assignment in general?
6. How useful was the literature (course book, literature, tools)?
7. How useful were the instructors' assistance?
8. How useful was the support from other student teams during the sessions?
9. How well do you rate the cooperation and the quality of work in your case team?
10. How useful would you consider the application and practice based approach that we chose for this course?
11. Look back on the case assignment and the course; what did you like in particular about the course and the case assignment? (max 300 words)
12. How many hours (approximate estimation) did you spend on making the case assignment (individually)? (excluding all other time you spend on learning such as weekly assignments for bonus)
13. Please enter your student number s-number.
14. Do you have any other remarks? (max 100 words)

Thank you for reflecting on your case assignment and course work process!

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